

RECEIVED FROM GOVERNMENT AUTHORITY, SPECIFICATIONS OR OTHER DATA ARE MADE
FOR OFFICIAL INFORMATION USE ONLY. THE UNITED STATES GOVERNMENT THEREFORE HAS
NO CONTRACTUAL LIABILITY FOR ANY USE OF THESE DATA. NO PART OF THIS DRAWING
MAY BE COPIED OR REPRODUCED, IN WHOLE OR IN PART, WITHOUT THE WRITTEN
CONSENT OF THE CONTRACTOR. NO PART OF THIS DRAWING MAY BE USED AS A
BASIS FOR ANOTHER CONTRACT, NOR MAY IT BE USED AS A BASIS FOR A
SUBSEQUENT CONTRACT.

REVISIONS			
SONG	SYM	DESCRIPTION	DATE APPROVAL
1	B	AND FIN A	1-15-67 PD

NOTES:

1. OPERATION - THE CONVERTER MEMORY UNIT OPERATES WITH THE DISPLAY UNIT IN THE FOLLOWING MANNER: WITH THE DISPLAY ON/OFF LINE IN HIGH VOLTAGE CONDITION, A 4 WIRE BCD CODE (DEFINED BELOW) IS ENTERED ON THE DIGIT CODE INPUT LINE. THE LINE IS AT A HIGH VOLTAGE DURING THE STORE PERIOD. THE STORE LINE TO THE MEMORY FOR THE "A" DIGIT IS CHANGED FROM LOW TO HIGH VOLTAGE. THE STORE LINE REMAINS AT THE HIGH VOLTAGE FOR 20 MICROSECONDS MINIMUM (SEE TIMING DIAGRAM). BEFORE RETURNING TO THE LOWER INHIBIT VOLTAGE, DURING THE STORE TIME HIGH VOLTAGE PERIOD, THE BCD CODE LINES DO NOT CHANGE.

INPUT	DIGIT DISPLAYED
8 4 2 1	
0 0 0 0	0
0 0 0 1	1
0 0 1 0	2
0 0 1 1	3
0 1 0 0	4
0 1 0 1	5
0 1 1 0	6
0 1 1 1	7
1 0 0 0	8
1 0 0 1	9

SIMULTANEOUS WITH OR FOLLOWING BUT NOT PRIOR TO THE RETURN TO THE INHIBIT VOLTAGE, THE BCD CODE CHANGES. THE PERIOD OF CHANGING IS APPROXIMATELY 5 MICROSECONDS MINIMUM. AFTER THE CODE LINES ARE AT A STEAD STATE VALUE, THE STORE LINE IS SET TO HIGH VOLTAGE AND THE STORE CYCLE IS REPEATED. THE SEQUENCE DESCRIBED ABOVE IS REPEATED UNTIL ALL DIGITAL MEMORIES HAVE BEEN SET TO THEIR DESIRED VALUES. AFTER AN INDEFINITE "ON" PERIOD, THE MEMORY IS RESET BY CHANGING THE DISPLAY ON/OFF SIGNAL TO LOW VOLTAGE CONDITION AND HOLDING FOR 2.5 SECONDS MINIMUM.

2. ELECTRICAL CHARACTERISTICS

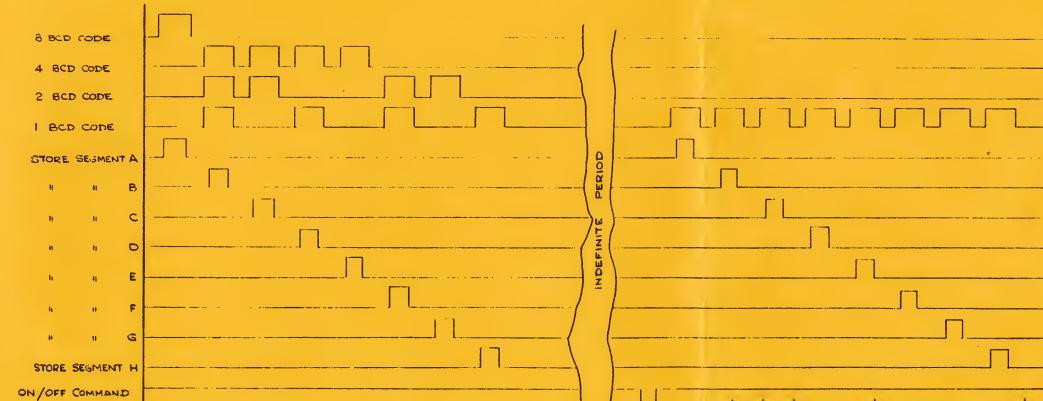
A) POWER INPUTS

- 1) 27 TO 22 VOLTS DC WITH LESS THAN 0.500 VOLT RIPPLE AT 200 MA.
- 2) 10 TO 12 VOLTS DC WITH LESS THAN 0.5 VOLT RIPPLE AT 500 MA.
- 3) 7 TO 8V VOLTS DC WITH LESS THAN 0.500 VOLT RIPPLE AT 2.5 AMP.

B) SIGNAL INPUTS

- 1) BCD CODE SIGNALS - 3-10 VOLTS INTO 3K FOR A "1" AND 0 TO 0.3 VOLTS FOR A "0".
- 2) STORE SIGNALS - 3-10 VOLTS INTO 10K FOR THE COMMAND TO STORE AND 0 TO 0.300 VOLTS FOR THE COMMAND TO INHIBIT THE MEMORY.
- 3) DISPLAY ON/OFF SIGNAL - 0 TO 30 VOLTS AT LESS THAN .5 MILLIAMPERES FOR A "DISPLAY" AND 0 TO 0.300 VOLTS AT LESS THAN 2 MA FOR A "NOT DISPLAY".

3. PIN CONNECTIONS - SEE SHEET #2



TIMING DIAGRAM

REQD BETWEEN NUMBER CHANGES.		ITEM	REQD	PART NO.	DESCRIPTION	MATL	MATL SPEC	UNIT WT
		UNLESS OTHERWISE SPECIFIED						
		THE RADIAL DIMENSIONS ARE IN INCHES						
		DECIMAL POINT POSITION IS						
		DEGREES + COORD. ANGLES 2 1/2°						
		DO NOT SCALE THIS DRAWING						
		MATERIAL						
		CONT. NO. 70064						
		DATE 1-15-67						
		DESIGN BY DATE						
		APPROVED BY DATE						
		EXCUTED BY DATE						
		APPROVED BY DATE						
NEXT ASSY	USED ON							
APPLICATION								
		SCALE FULL						
		UNIT WT						
		CODE 99479						
		SHEET 1 OF 2						

MEMORY, CONVERTER,
& POWER SUPPLY
PACKAGE

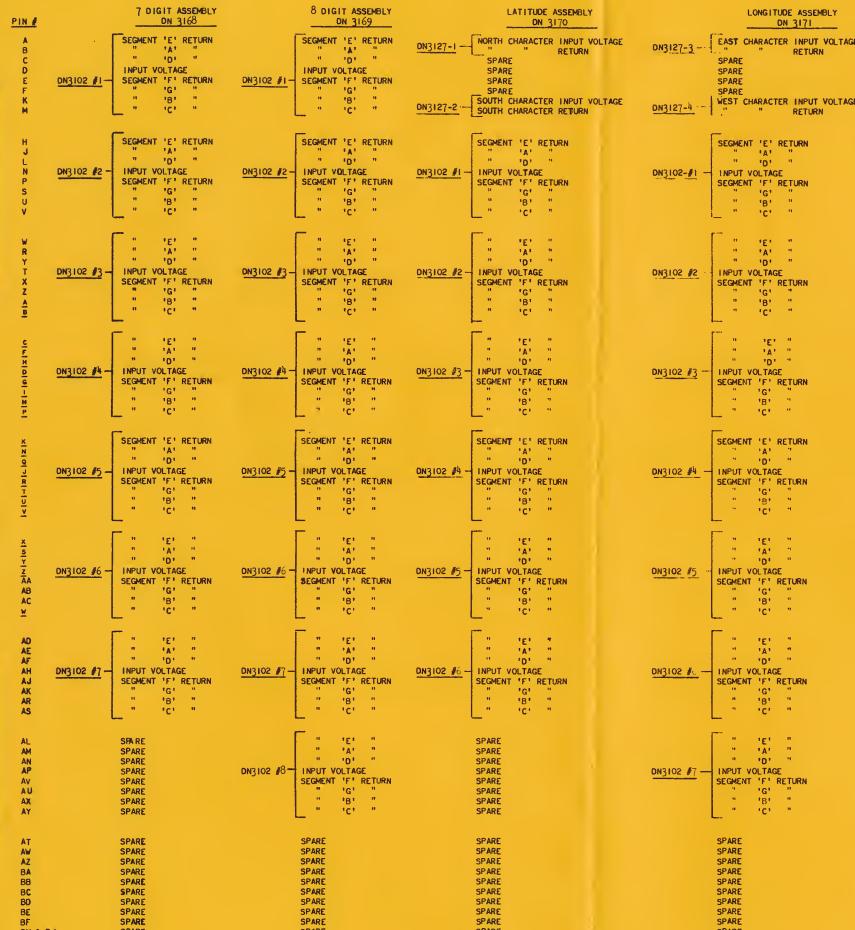
BOWMAR INSTRUMENT
CORPORATION
8000 BLUFTON RD.
PORT WAYNE, INDIANA

DRAWING NO. DN3172
SHEET 1 OF 2

NOTICE: UNDER TRADE SECRET LAW, DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR AND PURPOSES ONLY AS IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION. THE UNITED STATES GOVERNMENT THEREFORE SECURES THE EXCLUSIVE OWNERSHIP OF THESE DRAWINGS, SPECIFICATIONS, OR OTHER DATA. NO ONE ELSE WHATSOEVER MAY HAVE FORGOTTEN, PUBLISHED, OR IN ANY WAY DISCLOSED THE SAME DRAWINGS, SPECIFICATIONS, OR OTHER DATA. IN NO EVENT IS IT PERMITTED TO REPRODUCE OR DISCLOSE THESE DRAWINGS, SPECIFICATIONS, OR OTHER DATA, OR TO USE THEM IN MANUFACTURE, USE OR SALE OF ANY PRODUCT OR PROCESS WHICH IS BASED ON THE DRAWINGS, SPECIFICATIONS, OR OTHER DATA, OR TO FURNISH THEM TO ANYONE WHO IS NOT ENTITLED TO RECEIVE THEM. NO ONE ELSE WHATSOEVER MAY HAVE FORGOTTEN, PUBLISHED, OR IN ANY WAY DISCLOSED THE SAME DRAWINGS, SPECIFICATIONS, OR OTHER DATA. IN NO EVENT IS IT PERMITTED TO REPRODUCE OR DISCLOSE THESE DRAWINGS, SPECIFICATIONS, OR OTHER DATA, OR TO USE THEM IN MANUFACTURE, USE OR SALE OF ANY PRODUCT OR PROCESS WHICH IS BASED ON THE DRAWINGS, SPECIFICATIONS, OR OTHER DATA, OR TO FURNISH THEM TO ANYONE WHO IS NOT ENTITLED TO RECEIVE THEM.

REVISIONS			
ZONE	SYM	DESCRIPTION	DATE
			2-22-65 <i>JF</i>

U.S. COMPONENTS CONNECTOR #SMI-75-MISL



	DESCRIPTION
A	+20 VOLTS DC
B	+7.5 VOLTS DC
C	+1.5 VOLTS DC RETURN
D	+25 VOLTS DC RETURN
E	+11 VOLTS DC
F	+1 VOLTS DC RETURN
H	BCD 1 INPUT
J	BCD 2 INPUT
K	BCD 5 INPUT
L	BCD 7 INPUT
M	DISPLAY ON/OFF COMMAND
N	REGULATED LINE SUPPLY OUTPUT
P	CONVERTER OUTPUT SEGMENT A
R	CONVERTER OUTPUT SEGMENT B
S	CONVERTER OUTPUT SEGMENT C
T	CONVERTER OUTPUT SEGMENT D
U	CONVERTER OUTPUT SEGMENT E
V	CONVERTER OUTPUT SEGMENT F
W	CONVERTER OUTPUT SEGMENT G
X	BUZZER
Y	DISPLAY ON/OFF RETURN
Z	CONVERTER OUTPUT RETURN
AA	CHARACTER (x1) COMMAND
BB	CHARACTER (x2) COMMAND
CC	INHIBIT CHARACTER (x1)
DD	INHIBIT CHARACTER (x2)
EE	INHIBIT ON 3102 No 1
FF	INHIBIT ON 3102 No 2
HH	INHIBIT ON 3102 No 3
JJ	INHIBIT ON 3102 No 4
KK	INHIBIT ON 3102 No 5
LL	INHIBIT ON 3102 No 6
MM	INHIBIT ON 3102 No 7
NN	INHIBIT ON 3102 No 8
PP	REMOTE VOLTAGE SENSE
RR	SPARE
SS	SPARE
TT	SPARE
UU	SPARE
VV	SPARE
WW	SPARE
XX	SPARE
	NOTE THAT ON DH3171, DH3168, T
	ON DH-3171 (x1) = HIGH
	ON DH-3171 (x2) = LOW
	ON DH-3171 (x3) = EAST
	ON DH-3171 (x2) = WEST

OMES SPA

DRAWING NO.
DN3172

DN3172 - 4	LONGITUDE	DN3171
DN3172 - 3	LATITUDE	DN3170
DN3172 - 2	8 DIGITS	DN3169
DN3172 - 1	7 DIGITS	DN3168
PART	ASSOCIATED DISPLAY	OUTLINE NR.

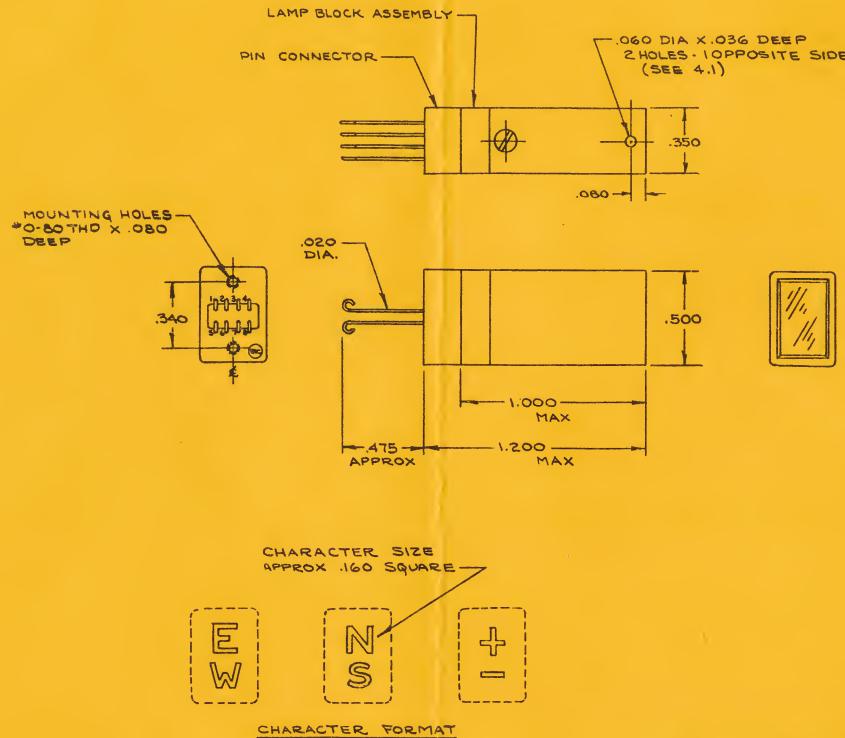
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

ITEM	REOD	PART NO.	DESCRIPTION	MATERIAL	MATERIAL SPEC	UNIT WT
			LIST OF MATERIAL			
			UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES			
			TOLERANCES ON FRACTIONS			
			DECIMALS - ANGLES			
			DO NOT SCALE THIS DRAWING			
			MATERIAL			
NEXT ASSY	USED ON		CONT NO. 7006-4		MEMORY, CONVERTER, & POWER SUPPLY PACKAGE	BOWMAR INSTRUMENT CORPORATION 8000 BLUFFTON RD. PORT WAYNE, INDIANA
APPLICATION			MADE BY DRAFTED BY CHECKED BY APPROVED BY			DRAWING NO. DN 3172
			SCALE ~	UNIT WT		CODE #9679 SHEET 2 OF 2

UNLESS OTHERWISE SPECIFIED

1—Do Not Scale Drawings.
 2—Thread Length Dimensions Are for Full Threads.
 3—Tolerances on Dimensions (Including Holes)
 Decimal: .005
 Fractional: 1/2"
 Angular: 7°

4—Remove All Burrs and Sharp Corners.
 5—Roughness of Surfaces Not to Exceed .005 Microinches Rms.
 6—Symbols \oplus , \ominus and \ominus Show that Surfaces Indicated by Arrows or Some Letters (e.g., (A)) Must Be Held Concentric, Square or Parallel Respectively Within the Limits Specified.



INDIVIDUAL SIGNAL LINES

- 1
- 2 — UPPER CHARACTER
- 3 — UPPER CHARACTER
- 4
- 5 — LOWER CHARACTER
- 6 — LOWER CHARACTER
- 7 — COMMON
- 8

FUNCTION DIAGRAM

OUTLINE NUMBER	CHARACTER DISPLAY	INPUT VOLTAGE	CURRENT PER CHARACTER	POWER PER CHARACTER	CHARACTER INTENSITY
DN-3176-9	PLUS-MINUS	4 VDC	142 MILLIAMPS	568 MILLIWATTS	800 MIN AVG FOOT-LAMBERTS
DN-3176-8	NORTH-SOUTH	4 VDC	142 MILLIAMPS	568 MILLIWATTS	800 MIN AVG FOOT-LAMBERTS
DN-3176-7	EAST-WEST	4 VDC	142 MILLIAMPS	568 MILLIWATTS	800 MIN AVG FOOT-LAMBERTS
DN-3176-6	PLUS-MINUS	4 VDC	132 MILLIAMPS	528 MILLIWATTS	400 MIN AVG FOOT-LAMBERTS
DN-3176-5	NORTH-SOUTH	4 VDC	132 MILLIAMPS	528 MILLIWATTS	400 MIN AVG FOOT-LAMBERTS
DN-3176-4	EAST-WEST	4 VDC	132 MILLIAMPS	528 MILLIWATTS	400 MIN AVG FOOT-LAMBERTS
DN-3176-3	PLUS-MINUS	4 VDC	106 MILLIAMPS	424 MILLIWATTS	200 MIN AVG FOOT-LAMBERTS
DN-3176-2	NORTH-SOUTH	4 VDC	106 MILLIAMPS	424 MILLIWATTS	200 MIN AVG FOOT-LAMBERTS
DN-3176-1	EAST-WEST	4 VDC	106 MILLIAMPS	424 MILLIWATTS	200 MIN AVG FOOT-LAMBERTS

BOWMAR INSTRUMENT CORPORATION CLAIMS PROPRIETARY RIGHTS IN THE MATERIAL DISCLOSED HEREON. THIS DRAWING IS ISSUED IN CONFIDENCE FOR ENGINEERING INFORMATION ONLY AND MAY NOT BE REPRODUCED OR USED TO MANUFACTURE ANYTHING SHOWN WITHOUT DIRECT WRITTEN PERMISSION FROM BOWMAR TO USER.

NOTES:

1.0 GENERAL DESCRIPTION - THE MODEL DN-3176 OPTICATOR IS A MINIATURE, SELF-ILLUMINATED, BRIGHT PRESENTATION DISPLAY DEVICE, WITHOUT STORAGE CAPABILITIES. IT IS DESIGNED FOR COMPATIBILITY WITH DIGITAL DEVICES AND COMPUTERS HAVING CONTINUOUS OUTPUT SYSTEMS.

2.0 ELECTRICAL CHARACTERISTICS

2.1 INPUT VOLTAGE: SEE TAB
 2.2 CURRENT PER CHARACTER: SEE TAB
 2.3 POWER PER CHARACTER: SEE TAB
 2.4 ELECTRICAL CHARACTERISTICS ARE APPLICABLE ONLY TO NORMAL SUPPLY VOLTAGE AND NORMAL ROOM AMBIENT TEMPERATURES.

3.0 OPTICAL CHARACTERISTICS

3.1 CHARACTER INTENSITY
 3.1.1 NORMAL INTENSITY - LIGHT INTENSITY OF ILLUMINATED CHARACTER AT RATED VOLTAGE: SEE TAB
 3.1.2 REDUCED INTENSITY - LIGHT INTENSITY MAY BE REDUCED BY REDUCING THE APPLIED D.C. VOLTAGE.
 3.2 CONTRAST
 3.2.1 RATIO OF ILLUMINATED CHARACTER TO ADJACENT BACKGROUND - 100:1 MINIMUM
 3.2.2 RATIO OF ILLUMINATED CHARACTER TO UNILLUMINATED CHARACTER - 100:1 MINIMUM
 3.3 VIEWING ANGLE
 3.3.1 ALL CHARACTERS RECOGNIZABLE AT AN ANGLE OF $\pm 15^\circ$ FROM BOTH THE HORIZONTAL AND VERTICAL CENTERLINE.
 3.4 EACH CHARACTER IS ILLUMINATED BY TWO LAMPS.

4.0 MECHANICAL CHARACTERISTICS

4.1 TWO HOLES ARE PROVIDED FOR EXTRACTION FROM A PANEL DISPLAY.
 4.2 REPLACEABLE LAMP BLOCK ASSEMBLY.
 4.3 MATERIAL AND FINISH
 4.3.1 HOUSING: ALUMINUM BLACK ANODIZED PER MIL-A-8625.
 4.3.2 CONNECTOR: BLACK DIALLYL PER MIL-M-14.
 4.3.3 CONTACTS: PHOSPHOR BRONZE GOLD PLATED.
 4.3.4 HARDWARE: NON-CORROSIVE MATERIALS

5.0 ENVIRONMENTAL

5.1 ALTITUDE: PER MIL-E-5272C, PROCEDURE VI, CONDITION F.
 5.2 SHOCK: PER MIL-E-5272C, PROCEDURE V.
 5.3 VIBRATION: PER MIL-E-5272C, PROCEDURE XII, CURVE A.
 5.4 HIGH TEMPERATURE: PER MIL-E-5272C, PROCEDURE II.
 5.5 LOW TEMPERATURE: PER MIL-E-5272C, PROCEDURE I.
 5.6 HUMIDITY: PER MIL-E-5272C, PROCEDURE I.
 5.7 FUNGUS: PER MIL-E-5272C, PROCEDURE I.
 5.8 SAND AND DUST: PER MIL-E-5272C, PROCEDURE I.

DN-3176

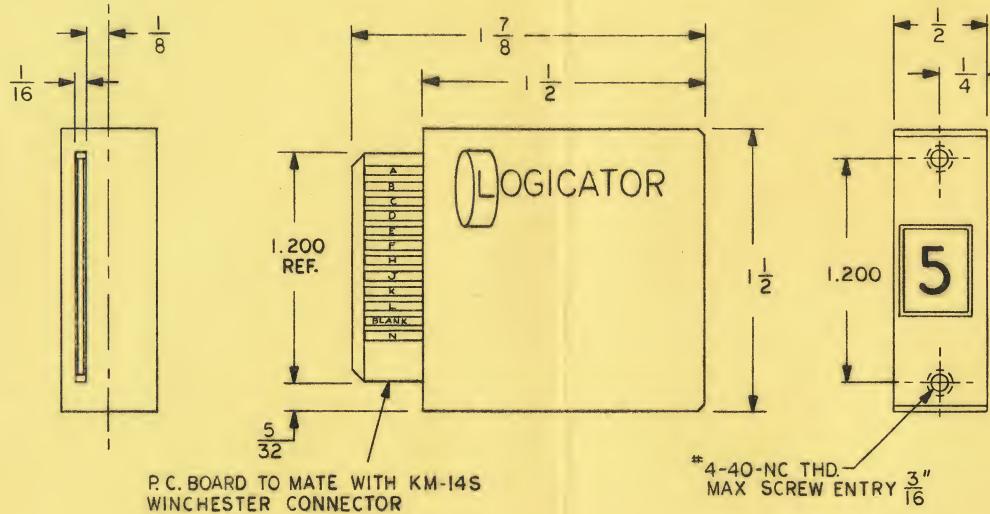
A

DR BY	DATE	BOWMAR INSTRUMENT CORPORATION	
JOH	1/6/65	CODE 99479	
OK BY	DATE	FORT WAYNE, INDIANA	
		ORIGINAL MODELS	
		S.O. 612	
		SIMILAR TO	
APD BY	DATE	OPTICATOR	DN-3176
APPROVAL			
SCALE		MATERIAL	

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT CONTRACT, THE CONTRACTOR SHALL NOT BE EXEMPTED FROM LIABILITY FOR INFRINGEMENT OF ANY PATENT, TRADE SECRET, OR OTHER INTELLECTUAL PROPERTY OWNED BY ANOTHER, NOR RESPONSIBILITY FOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE DRAWINGS, SPECIFICATIONS, OR OTHER DATA, OR THAT THE GOVERNMENT IS THE INFLUENTIAL SOURCE OF THE DRAWINGS, SPECIFICATIONS, OR OTHER DATA, SHALL NOT BE CONSTRUED AS IMPLIQUING ANY LICENSE IN ANY PATENT, TRADE SECRET, OR OTHER INTELLECTUAL PROPERTY OWNED BY ANOTHER, NOR AS EXEMPTING THE CONTRACTOR FROM THE REQUIREMENT TO DETERMINE, AT ITS OWN EXPENSE, WHETHER OR NOT THE CONTRACTOR'S MANUFACTURE, USE, OR SALE ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL



NOTES:

1.0 GENERAL

1.1 A FAST RESPONDING DISPLAY UNIT WHICH IS PULSE-ACTUATED BY AN EXTERNALLY SUPPLIED ELECTRICAL DRIVE LOGIC. INTRINSIC MEMORY MAGNETICALLY RETAINS THE READOUT DRUM IN POSITION UNTIL A NEW PULSE IS APPLIED.

2.0 ELECTRICAL

- 2.1 VOLTAGE: +24V DC
- 2.2 POWER: 2.5 WATTS NOMINAL
- 2.3 OPERATING TEMPERATURE RANGE: -20°C TO +71°C
- 2.4 PULSE TIME: 500 MILLISECONDS
- 2.5 INPUTS: 10 PLUS COMMON
- 2.6 DUTY CYCLE: 5%
- 2.7 INSULATION RESISTANCE: 1,000 MOEGHMS MINIMUM WITH 500V DC APPLIED BETWEEN WINDINGS AND CASE.
- 2.8 HIGH POTENTIAL: 500V, 60 CPS RMS

3.0 MECHANICAL

- 3.1 CHARACTERS: STYLE PER MS 33558-ASG, 9/32 INCH HIGH AND NORMAL WIDTH, WHITE ON BLACK BACKGROUND.
- 3.2 VIEWING ANGLE: ±35°
- 3.3 WEIGHT: 1.5 OZ.
- 3.4 CASE: DULL BLACK

DRAWING NO.
DN 3177

ITEM	REQD	PART NO.	DESCRIPTION	MATL	MATL SPEC	UNIT WT
LIST OF MATERIAL						

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONST _{1/32} DECIMALS ± .005 ANGLES ± 10°	CONT NO. <i>16 Jan 75</i>	LOGICATOR	BOWMAR INSTRUMENT CORPORATION 8000 BLUFFTON RD. FORT WAYNE, INDIANA
DO NOT SCALE THIS DRAWING	DRAWN BY DATE APPROVED MFG DATE		
MATERIAL	CHECKED BY DATE APPD ENGR DATE		
NEXT ASSY USED ON	APPLICATION		
SCALE —	UNIT WT —		

DRAWING NO.
DN 3177

CODE 99479 SHEET OF